

**A treatise on a group of seven species of the genus *Rhyparus* Westwood, 1845
(Coleoptera: Aphodiidae: Rhyparinae: Rhyparini) from the Western Hemisphere**

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Taxonomy, new species, Coleoptera, Aphodiidae, Rhyparinae, Rhyparini, Western Hemisphere, Neotropical Region

Abstract. The following seven species of the genus *Rhyparus* Westwood, 1845 from the Western Hemisphere sharing three rows of punctures in the second flat elytral interval, including three new species from Ecuador, are discussed: *Rhyparus costaricensis* Cartwright et Woodruff 1969, *R. isidro*i Cartwright et Woodruff 1969, *R. zayasi* Cartwright et Woodruff 1969, *R. spilmani* Cartwright et Chalumeau 1978, *R. kaboureki* sp. nov., *R. kudrnai* sp. nov., and *R. snizeki* sp. nov. The three new species are described, all the species of the group are keyed, and appropriate illustrations are provided.

INTRODUCTION

In the course of a study of aphodiid specimens from Ecuador, the authors found three new species of the genus *Rhyparus* Westwood, 1845.

Eleven species of the genus have still been known from the Western Hemisphere. Ten of them were revised by Cartwright & Woodruff (1969) and since then, another species was described by Cartwright & Chalumeau (1978). In accordance with this, Skelley (2008) presented a list of 11 species from the Western Hemisphere comprising the species as follows: *R. blantoni* Cartwright et Woodruff, 1969 from Panama, *R. costaricensis* Cartwright et Woodruff, 1969 from Costa Rica and Mexico, *R. denieri* (Martinez, 1950) from Bolivia, *R. isidro*i Cartwright et Woodruff, 1969 from Costa Rica, *R. mexicanus* Cartwright et Woodruff, 1969 from Mexico (Veracruz), *R. opacus* Cartwright et Woodruff, 1969 from Mexico (Veracruz), *R. sculpturatus* Cartwright et Woodruff, 1969 from Costa Rica, *R. spangleri* Cartwright et Woodruff, 1969 from Costa Rica, *R. spilmani* Cartwright et Chalumeau, 1977 from West Indies (Dominica, and Guadeloupe), *R. suspiciosus* Cartwright et Woodruff, 1969 from Costa Rica, and *R. zayasi* Cartwright et Woodruff, 1969 from Cuba, Dominican Republic and Jamaica.

MATERIAL AND METHODS

The specimens (all of them holotypes, allotypes or paratypes) were examined as specified below.

The following abbreviations stand for collections, in which the specimens studied here are kept:

- LM Ladislav Mencl, private collection, Týnec nad Labem, the Czech Republic;
 MR Miloslav Rakovič, private collection, Dobřichovice, the Czech Republic;
 NMPC National Museum, Prague, the Czech Republic;
 USNM Smithsonian Institution, National Museum of Natural History, Washington, U.S.A.;
 VK Vít Kabourek, private collection, Zlín, the Czech Republic

In addition to the type material of the three new species as specified below in the section Results, we studied holotypes of the following three related species, which we received on loan from the Smithsonian Institution, National Museum of Natural History, Washington D. C., U.S.A.:

R. costaricensis Cartwright et Woodruff, 1969 - holotype equipped with the following labels:

1) white handwritten: ♂; 2) white, printed: COSTA RICA: Prov. San Jose, San Isidro del General; 3) white, printed: 30 VII 64, R. E. Woodruff, blacklight trap; 4) white, printed: Property Woodruff; 5) red, printed: HOLOTYPE, *Rhyparus costaricensis*, Cartw. & Woodr.

R. isidro Cartwright et Woodruff, 1969 - holotype equipped with the following labels:

1) white, printed: COSTA RICA: Prov. San Jose, Isidro de Coronado; 2) white, handwritten: Finca J. Smids, 13-VI-67; 3) white, printed: R. E. Woodruff collection; 4) red, printed: HOLOTYPE, *Rhyparus isidro*, Cartw. & Woodr.

R. zayasi Cartwright et Woodruff, 1969 - holotype equipped with the following labels:

1) white handwritten: ♂; 2) white, printed/handwritten: Col. F. de Zayas, Sierra Maestra, Turquino 6 1964, Oriente CUBA; 3) red, printed: HOLOTYPE, *Rhyparus zayasi*, Cartw. & Woodr.

The MBS-10 and SZP 1120-T stereoscopic microscopes were employed in the observations. The photos published here were taken with the help of the Meopta laboratory microscope and CMOS 5 digital camera with the Helicon Focus programme.

The aedeagus was treated by boiling with a 10% sodium hydroxide solution.

Rhyparinae exert certain special features of the elytral structure compared to some other groups of Aphodiidae. They are defined, explained and interpreted in next paragraphs; the definitions will be observed below in the section Results (in descriptions and in the key).

The following terms will be subjected to this explanation: costae and flat intervals and their numbering, preapical glandular area and apical bulbous area. Most terms were adopted from Cartwright & Woodruff (1969) and Cartwright & Chalumeau (1978) and are detailed as follows.

Costae and flat intervals. The elytron has 5 costae: a flat sutural costa and 4 elevated costae (counting sutural, the costae are numbered from 1 (the sutural costa) to 5 (the most lateral one), and 5 flat (mostly coarsely punctate) intervals (also numbered from 1 to 5 in the same sequence of arrangement).

Preapical glandular area. Costae 2 to 4 are shortened posteriorly, their ends being tipped with yellowish white glandular material. Costa 5 is abruptly bent toward the 1st (sutural) costa behind the ends of costae 2 to 4 and covered with the same material (on its inside margin). Thus, there is a deeply depressed preapical glandular area delimited anteriorly by

ends of costae 2 to 4 and posteriorly by the inside margin of the inwardly bent terminal part of the 5th costa. The area can be relatively smaller or larger depending on the distance between the ends of costae 2 and 4 and the terminal part of the 5th costa.

Apical bulbous area. Behind the preapical glandular area, there is a transverse apical bulbous area, essentially produced by the inwardly bent terminal part of the 5th costa, which is extending to and fused with the 1st (sutural) costa.

RESULTS

The results of studying holotypes of the *R. costaricensis* Cartwright et Woodruff, 1969, *R. isidroï* Cartwright et Woodruff, 1969 and *R. zayasi* Cartwright et Woodruff, 1969 (as specified in Material and Methods) were used for writing the Key to Species. Characters observed on their underside are summarized in Table 1 below. Their dorsal aspects, ventral aspects and oblique views from top and rear are depicted in Figs 4-6, 12-14 and 18-20, respectively.

The results of examining the specimens from Ecuador are presented as follows.

***Rhyparus kudrnai* sp. nov.**

(Figs 1, 7, 15, 21, 24, 25, 30, 32)

Type material. Holotype (♂) bearing the following printed labels: 1) white: ECUADOR, PACTO, 1200-1400 M, 50 km NW QUITO, 25.02-03.03.2002, A. KUDRNA JR. LGT. 2) pale green: 1506, Dok. L. Mencl; 3) red: HOLOTYPE (♂), *Rhyparus kudrnai* sp. n., L. Mencl & M. Rakovič det. 2012 (LM).

Description. Small (4.6 mm), elongate, matte (only tops of ridges and costae feebly shining), somewhere with minute appressed setae as described below but otherwise glabrous, reddish brown to dark brown or nearly black.

Head (as observed from above) with shallow anterior clypeal emargination, with upturned angle each side of it, considerable lateral emargination and next (lateral) rather widely rounded angle separated by small emargination from strongly protruding round gena; clypeus margin has actually two (upper and lower) edges, separated one from another by a furrow extending from gena to gena, the lower edge being, however, only partially observable from above. Clypeal disc considerably convex, ringed with a deep groove; the convexity with a pair of more or less distinct short, slightly arcuate ridges, its surface with rather indistinct, fine punctures bearing minute, appressed, hardly perceptible setae. Frons with four longitudinal ridges; ridges of median pair situated each side of head midline similarly as two short ridges on clypeal convexity; distances between neighbouring median and lateral ridges larger than that between two median ones. Furrows between ridges with medium-sized punctures and head vertex with minute, appressed setae.

Pronotum with eight not sharp but considerably convex ridges and seven longitudinal furrows. Ridges of the first (median) pair continuous and convergent at anterior 1/3, constricted between deep transverse fossae present on each side in the second and third furrows and interrupting ridges of the second pair. Ridges of the 3rd and 4th (lateral) pairs continuous. Pronotum surface subopaque, elevated parts (ridges) feebly shining and equipped with minute, appressed, hardly perceptible setae. In addition to deep fossae at anterior 1/3, there

are also minor but distinct depressions in furrows at posterior 1/3 (not interrupting ridges). Anterior half of the first (median) furrow with distinct medium-sized punctures.

Elytra elongate, feebly shining. Each elytron with 5 costae, 5 flat intervals, preapical glandular area and apical bulbous area as explained in Methods; the preapical glandular area relatively large (Figs 1, 15). Shapes of particular costae as in Fig. 1. The costae with minute, appressed, hardly perceptible, obliquely backward directed setae. Punctures in elytral intervals considerably deep. The 1st flat interval with 3 rows of coarse punctures at base only, otherwise with 2 rows of coarse punctures, punctures of median row being smaller than those of lateral row, reduced in size posteriorly and vanishing in front of end of lateral row. Deep, coarse punctures of the 2nd flat interval arranged in 3 rows; punctures of central row smaller than those of outside and inside ones, sometimes transversally confluent with those of outside row, outside row extending essentially throughout, diameters of its punctures being, however, gradually smaller from elytra base to apex, inside row ending in front of terminal dilation of the 2nd costa and central row being usually even shorter. The 3rd flat interval with 3 rows of coarse punctures. The 4th flat interval with 2 rows of coarse punctures. The 5th flat interval with 1 row of rather obsolete punctures bearing setae. Apical bulbous area anteriorly with medium-sized setigerous punctures, apically with few large, non-setigerous pits.

Pygidium with a vertical central and two lateral impressions.

Posterior tibia apex fringed with very short, equal, dense spinules; tarsus about as long as tibia; basal metatarsite considerably longer than metatarsites 2-5 combined.

Ventral side as in Fig. 7. Ventral surfaces mostly with punctures bearing minute, pale, appressed setae. Punctures on profemur surface medium-sized, separated by at least puncture diameter. Punctures on mesofemur medium-sized, mostly separated by twice puncture diameter. Metafemur surface with small to medium-sized, fairly regularly distributed punctures. Longitudinal furrow of metasternal plate nearly complete, only slightly shortened anteriorly. Rows of coarse punctures present at lateral margins of abdominal ventrites (particularly on abdominal ventrite 3) extending over 1/3 of distance between ventrite midline and lateral margin. Setae in setigerous punctures of abdominal ventrites rather long but sparse. Terminal ventrite with few (3-4) pit-like punctures at middle; otherwise with fine to medium-sized punctures.

Aedeagus as in Figs 24, 25.

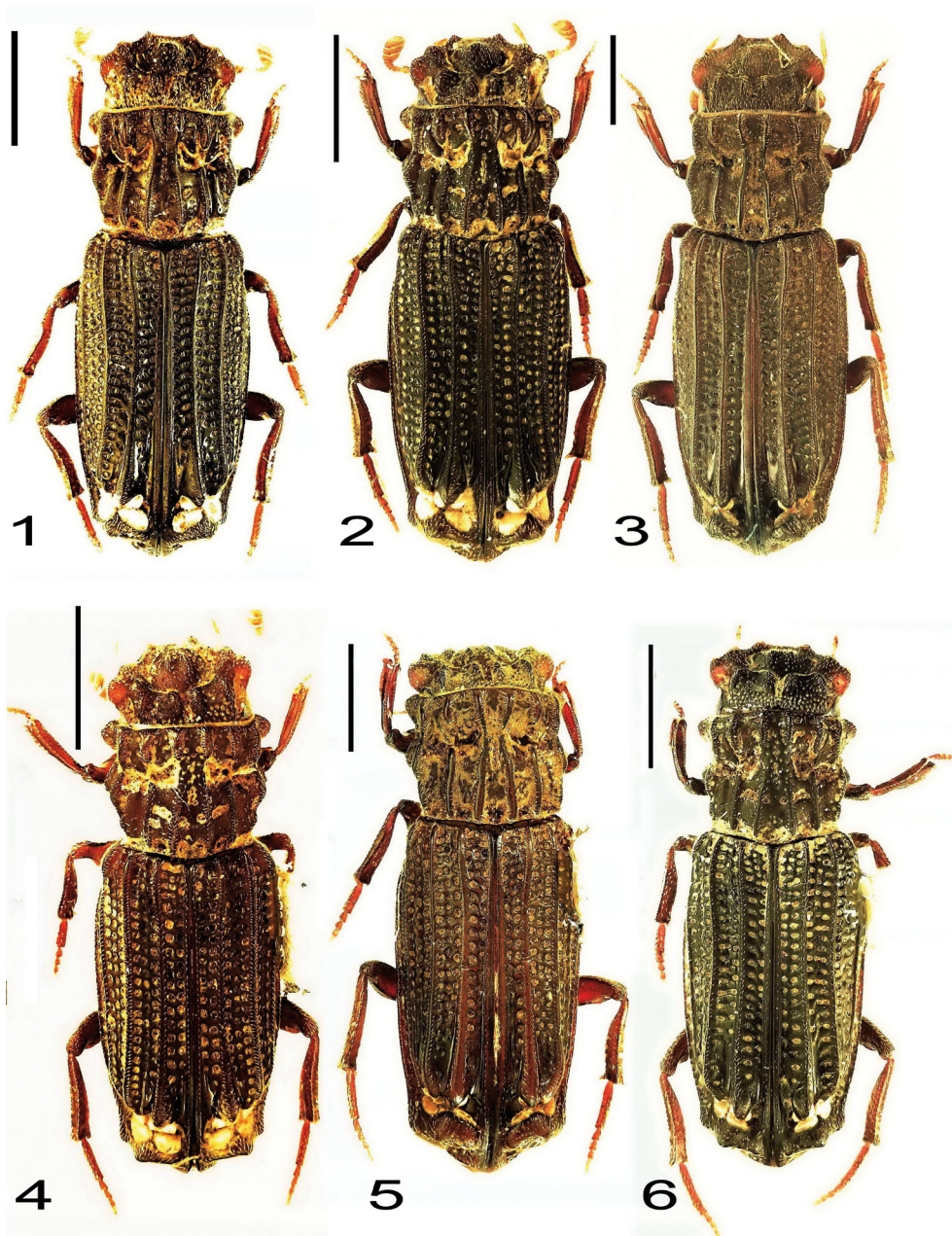
Epipharynx as in Fig. 21.

Female unknown.

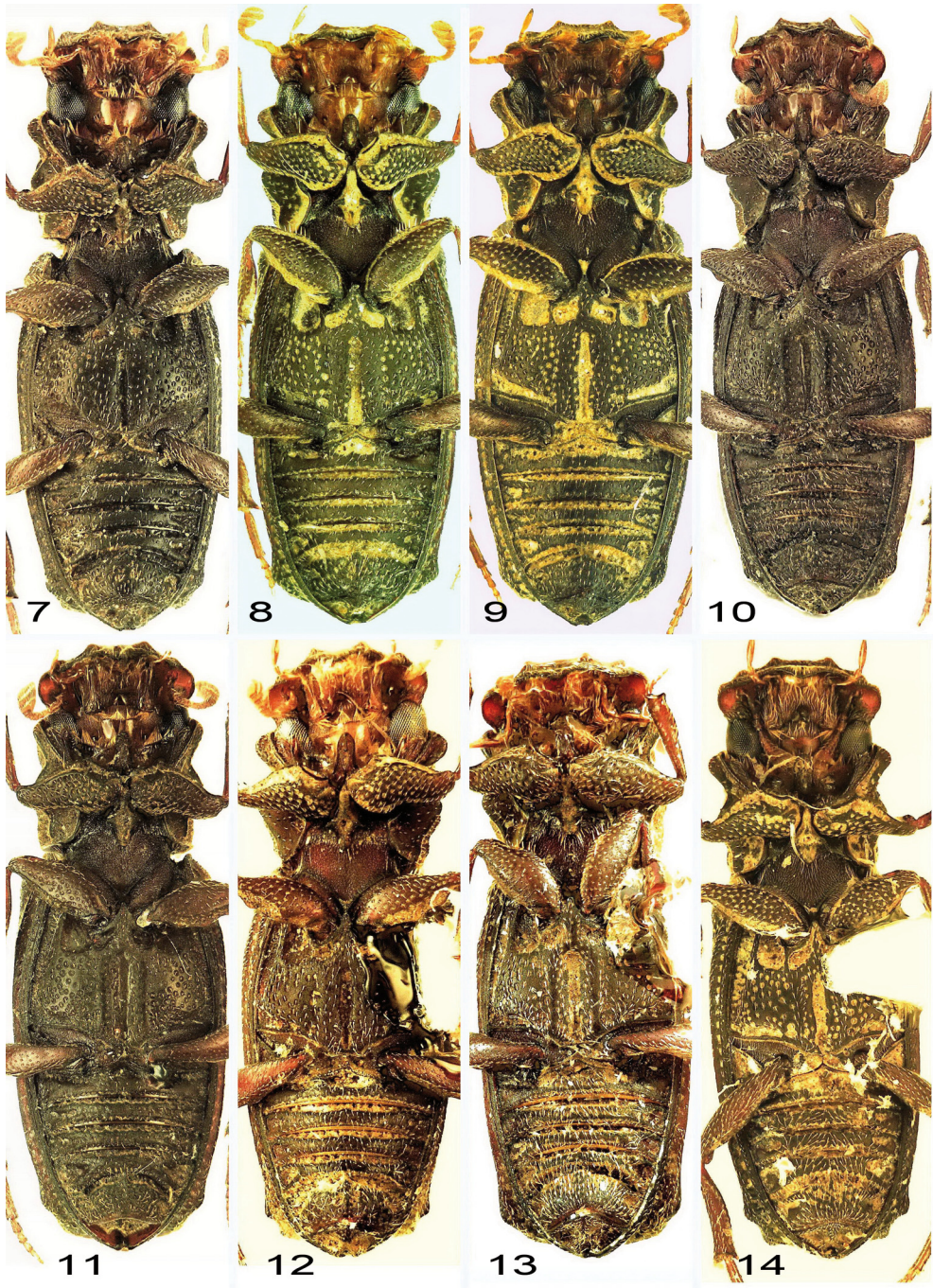
Differential diagnosis. The *R. kudrnai* sp. nov. is closest to the sympatric *R. snizeki* sp. nov. The two species differ one from another based on the characters observable on the underside as shown in the Key to Species below.

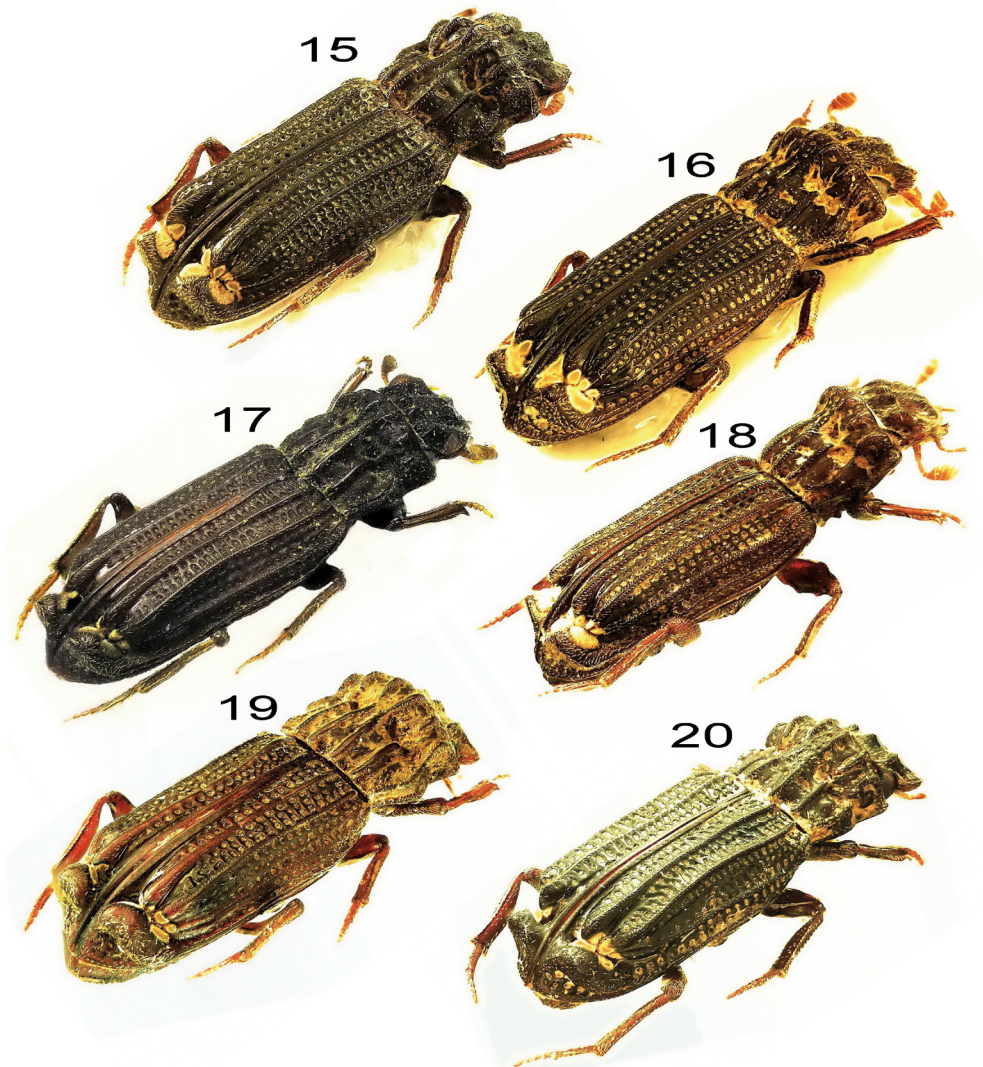
Distribution. Ecuador.

Name derivation. Patronymic. Named after the collector of the holotype.



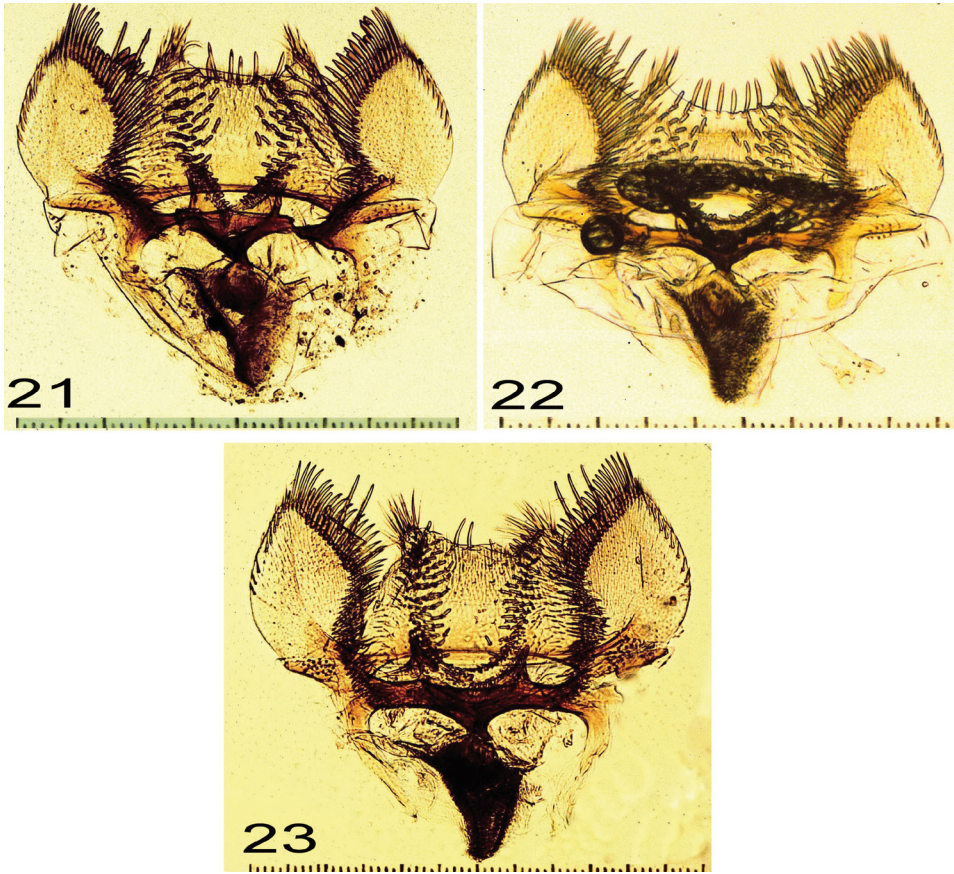
Figs 1-6. Habitus, dorsal aspect: 1- *Rhyparus kudrnai* sp. nov., ♂; 2- *R. snizeki* sp. nov., ♂; 3- *R. vitikaboureki* sp. nov., ♂; 4- *R. costaricensis* Cartwright et Woodruff, 1969, ♂; 5- *R. isidroii* Cartwright et Woodruff, 1969, ♂; 6- *R. zayasii* Cartwright et Woodruff, 1969, ♂. Scale lines 1 mm.





Figs 15-20. Oblique view from top and rear: 15- *Rhyparus kudrnai* sp. nov., ♂; 16- *R. snizeki* sp. nov., ♂; 17- *R. vitikabourecki* sp. nov., ♂; 18- *R. costaricensis* Cartwright et Woodruff, 1969, ♂; 19- *R. isidroii* Cartwright et Woodruff, 1969, ♂; 20- *R. zayasi* Cartwright et Woodruff, 1969, ♂.

←
 Figs 7-14. Habitus, ventral aspect: 7- *Rhyparus kudrnai* sp. nov., ♂; 8- *R. snizeki* sp. nov., ♂; 9- *R. snizeki* sp. nov., ♀; 10- *R. vitikabourecki* sp. nov., ♂; 11- *R. vitikabourecki* sp. nov., ♀; 12- *R. costaricensis* Cartwright et Woodruff, 1969, ♂; 13- *R. isidroii* Cartwright et Woodruff, 1969, ♂; 14- *R. zayasi* Cartwright et Woodruff, 1969, ♂.



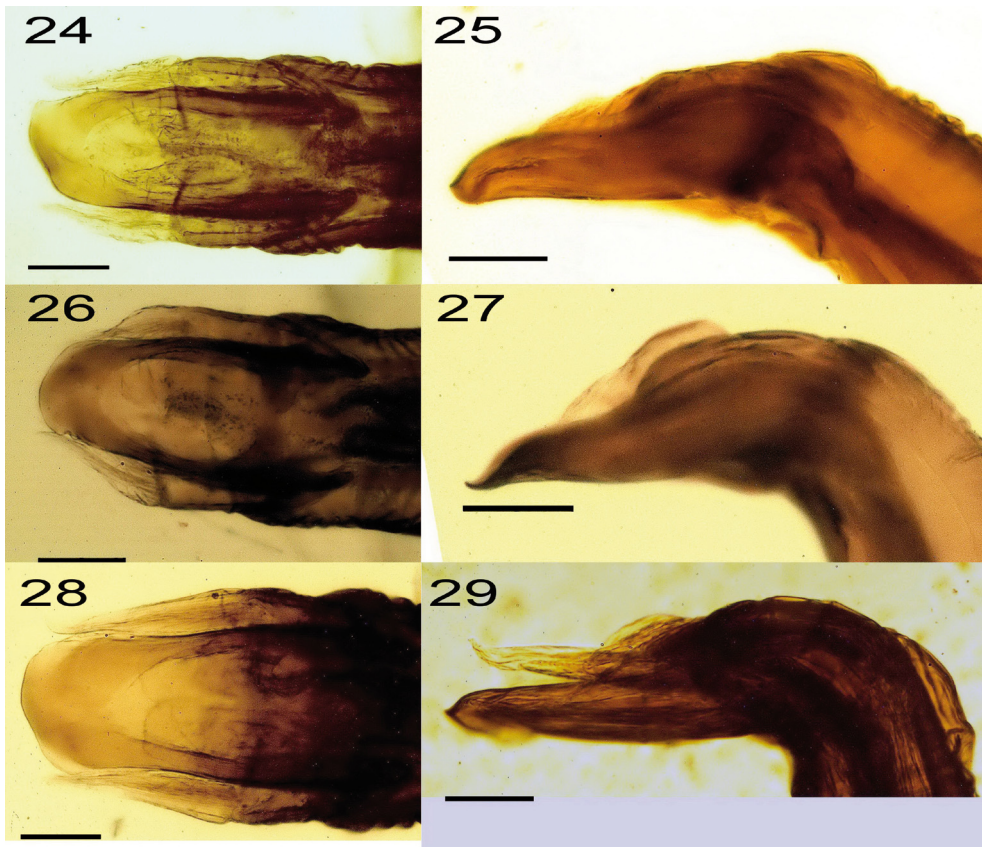
Figs 21-23. Epipharynx: 21- *Rhyparus kudrnai* sp. nov., ♂; 22- *R. snizeki* sp. nov., ♂; 23- *R. vitikabourecki* sp. nov., ♂. Scale lines 0.5 mm.

***Rhyparus snizeki* sp. nov.**

(Figs 2, 8, 9, 16, 22, 26, 27, 31, 33)

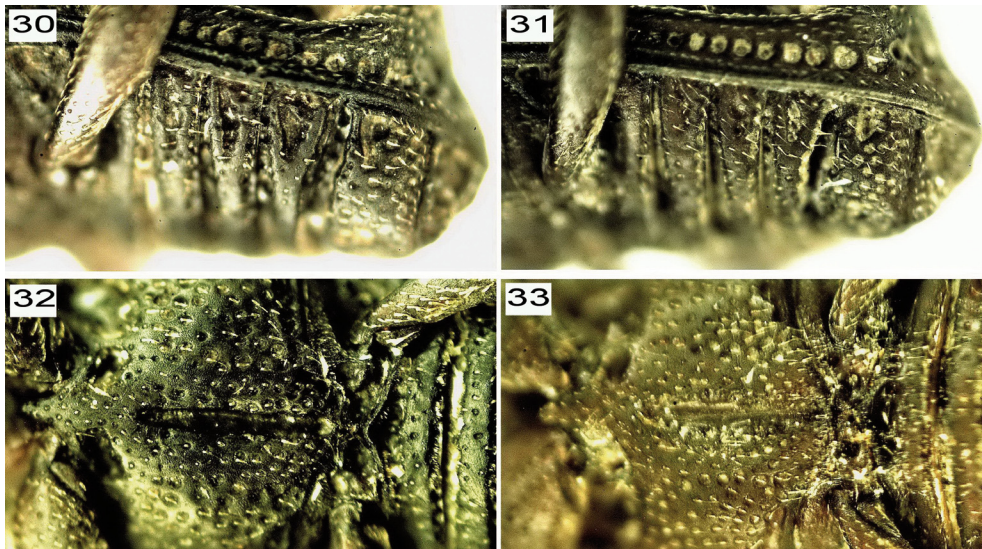
Type material. Holotype (♂) bearing the following printed labels: 1) white: ECUADOR SW, N of Machala, S of Naranjal, 19.1.2011, Lgt. M. Snížek, 0328/7940; 2) pale green: 1299, Dok. L. Mencl; 3) red: HOLOTYPE (♂), *Rhyparus snizeki* sp. n., L. Mencl & M. Rakovič det. 2012 (NMPC). Allotype (♀) bearing the following printed labels: 1) white: same data as with holotype 2) red: ALLOTYPE (♀), *Rhyparus snizeki* sp. n., L. Mencl & M. Rakovič det. 2012 (NMPC). Paratypes: (15 ♂♂, 41 ♀♀) bearing the following printed labels: 1) white: same data as with holotype 2) red: PARATYPE, *Rhyparus snizeki* sp. n., L. Mencl & M. Rakovič det. 2012 (1 ♂, 1 ♀ USNM; 8 ♂♂, 24 ♀♀ LM; 6 ♂♂, 16 ♀♀ MR; 1 ♂, 1 ♀ VK).

Description. Small (3.6-4.8 mm: male 3.6-4.2 mm, female 3.8-4.8 mm), elongate, feebly shining, somewhere with minute appressed setae as described below but otherwise glabrous, reddish brown to dark brown or nearly black.



Figs 24-29. Aedeagus: 24- *Rhyparus kudrnai* sp. nov., dorsal view; 25-*R. kudrnai* sp. nov., lateral view; 26- *R. snizeki* sp. nov., dorsal view; 27- *R. snizeki* sp. nov., lateral view; 28- *R. vitikabourecki* sp. nov., dorsal view; 29- *R. vitikabourecki* sp. nov., lateral view. Scale lines 0.1 mm.

Head (as observed from above) with shallow anterior clypeal emargination, with upturned angle each side of it, considerable lateral emargination and next (lateral) rather widely rounded angle separated by small emargination from strongly protruding round gena; clypeus margin has actually two (upper and lower) edges, separated one from another by a furrow extending from gena to gena, the lower edge being, however, only partially observable from above. Clypeal disc considerably convex, ringed with a deep groove; the convexity with a pair of more or less distinct, slightly arcuate ridges, its surface with distinct, fine punctures bearing minute, appressed, hardly perceptible setae. Frons with four longitudinal ridges; ridges of median pair situated each side of head midline similarly as two short ridges on clypeal convexity; distances between neighbouring median and lateral ridges larger than that between two median ones. Furrows between ridges with medium-sized punctures and head vertex with minute, appressed setae.



Figs 30-33. Lateral parts of ventrites and metasterna: 30- *Rhyparus kudrnai* sp. nov., ♂, lateral parts of ventrites; 31- *R. snizeki* sp. nov., ♂, lateral parts of ventrites; 32- *R. kudrnai* sp. nov., ♂, metasternum; 33- *R. snizeki* sp. nov., ♂, metasternum.

Pronotum with eight not sharp but considerably convex ridges and seven longitudinal furrows. Ridges of the first (median) pair continuous and convergent at anterior 1/3, constricted between deep transverse fossae present on each side in the 2nd and 3rd furrows and interrupting ridges of the 2nd pair. Ridges of the 3rd and 4th (lateral) pairs continuous. Pronotum surface subopaque, elevated parts (ridges) feebly shining and equipped with minute, appressed, hardly perceptible setae. In addition to deep fossae at anterior 1/3, there are also minor but distinct depressions in furrows at posterior 1/3 (not interrupting ridges). Anterior half of the first (median) furrow with distinct medium-sized punctures.

Elytra elongate, feebly shining. Each elytron with 5 costae, 5 flat intervals, preapical glandular area and apical bulbous area as explained in Methods; the preapical glandular area is relatively large (Figs 2, 16). Shapes of particular costae as in Fig. 2. The costae with minute, appressed, hardly perceptible, obliquely backward directed setae. Punctures in elytral intervals considerably deep. The 1st flat interval with 3 rows of coarse punctures at base only, otherwise with 2 rows of coarse punctures, punctures of median row being smaller than those of lateral row, reduced in size posteriorly and vanishing in front of end of lateral row. Deep, coarse punctures of the 2nd flat interval arranged in 3 rows; punctures of central row smaller than those of outside and inside ones, sometimes transversally confluent with those of outside row, outside row extending essentially throughout, diameters of its punctures being, however gradually smaller from elytra base to apex, inside row ending in front of terminal dilation of the 2nd costa and central row being usually even shorter. The 3rd flat interval with 3 rows of coarse punctures. The 4th flat interval with 2 rows of coarse punctures. The 5th flat interval with 1 row of rather obsolete punctures bearing setae. Apical bulbous area anteriorly with medium-sized setigerous punctures, apically with few large, non-setigerous pits.

Pygidium with a vertical central and two lateral impressions.

Posterior tibia apex fringed with very short, equal, dense spinules; tarsus about as long as tibia; basal metatarsite considerably longer than metatarsites 2-5 combined.

Ventral side as in Figs 8, 9. Ventral surfaces mostly with punctures bearing minute, pale, appressed setae. Punctures on profemur surface essentially everywhere medium-sized, separated by less than puncture diameter. Punctures on mesofemur surface smaller and shallower compared to those on profemur, sparser along anterior margin and at apex. Metafemur surface with medium-sized punctures in apical half, which become smaller and sparser in basal half. Longitudinal furrow of metasternal plate nearly complete, only slightly shortened anteriorly. Transversal rows of coarse punctures present at lateral margins of abdominal ventrites (particularly on the abdominal ventrite 3) extending over 1/3 of distance between ventrite midline and lateral margin. Terminal ventrite with coarse punctures anteriorly, becoming smaller and sparser posteriorly. Setae in setigerous punctures shorter than ventrites.

Aedeagus as in Figs 26, 27.

Epipharynx as in Fig. 22.

Sexual dimorphism. Middle and posterior tibiae of the female without the large triangular tooth projecting inward from the tibia apex, which is present in the male; only a small spine projects backward in female.

Differential diagnosis. The *R. snizeki* sp. nov. is closest to the sympatric *R. kudrnai* sp. nov. The two species differ one from another based on the characters observable on the underside as shown in the Key to Species below.

Distribution. Ecuador.

Name derivation. Patronymic. Named after the collector of the type material

***Rhyparus vitikabourecki* sp. nov.**

(Figs 3, 10, 11, 17, 23, 28, 29)

Type material. Holotype (♂) bearing the following printed labels: 1) white: ECUADOR, prov. NAPO, Baeza env., Cujuja, 1950 m, 24.-26.xi 2000, Igt. Kabourek; 2) pale green: 1521, Dok. L. Mencl; 3) red: HOLOTYPE (♂), *Rhyparus kabourecki* sp. n., L. Mencl & M. Rakovič det. 2012 (LM). Allotype (♀) bearing the following printed labels: 1) white: same data as with holotype; 2) pale green: 1520, Dok. L. Mencl; 3) red: ALLOTYPE (♀), *Rhyparus kabourecki* sp. n., L. Mencl & M. Rakovič det. 2012 (MR).

Description. Small (5.7-5.8 mm), elongate, matte (only tops of ridges and costae feebly shining), somewhere with minute appressed setae as described below but otherwise glabrous, dark brown, nearly black.

Head (as observed from above) with shallow anterior clypeal emargination, with upturned angle each side of it, considerable lateral emargination and next (lateral) rather widely rounded angle separated by small emargination from strongly protruding round gena; clypeus margin has actually two (upper and lower) edges, separated one from another by a furrow extending from gena to gena, the lower edge being, however, only partially observable from above. Clypeal disc considerably convex, ringed with a deep groove; the convexity with a

pair of more or less distinct short, slightly arcuate ridges, its surface with rather indistinct, fine punctures bearing minute, appressed, hardly perceptible setae. Frons with four longitudinal ridges; ridges of median pair situated each side of head midline similarly as two short ridges on clypeal convexity; distances between neighbouring median and lateral ridges larger than that between two median ones. Furrows between ridges with medium-sized punctures and head vertex with minute, appressed setae.

Pronotum with eight not sharp but considerably convex ridges and seven longitudinal furrows. Ridges of the first (median) pair continuous and convergent at anterior 1/3, constricted between deep transverse fossae present on each side in the second and third furrows and interrupting ridges of the second pair. Ridges of the 3rd and 4th (lateral) pairs continuous. Pronotum surface matte, elevated parts (ridges) feebly shining and equipped with minute, appressed, hardly perceptible setae. In addition to deep fossae at anterior 1/3, there are also minor but distinct depressions in furrows at posterior 1/3 (not interrupting ridges). Anterior half of the first (median) furrow with rather indistinct medium-sized punctures.

Elytra elongate, matte, tops of costae feebly shining. Each elytron with 5 costae, 5 flat intervals, preapical glandular area and apical bulbous area as explained in Methods; the preapical glandular area relatively small (Figs 3, 17). Shapes of particular costae as in Fig. 3. The costae with minute, appressed, hardly perceptible, obliquely backward directed setae. Punctures in elytral intervals moderately deep. The 1st flat interval with 3 rows of coarse (transversally confluent) punctures at base only, otherwise with 2 rows of coarse punctures. Relatively shallow coarse punctures of the 2nd flat interval arranged in 3 rows; punctures of central row frequently transversally confluent with those of outside row; outside row essentially complete; central and inside rows only slightly shortened posteriorly; diameters of punctures in central row not considerably smaller compared to those of outside and inside rows. The 3rd flat interval with 3 rows of coarse punctures nearly reaching the apical bulbous area. The 4th flat interval with 2 rows of coarse punctures. The 5th flat interval with 1 row of rather obsolete punctures bearing setae. Apical bulbous area anteriorly with medium-sized setigerous punctures, apically with few large, non-setigerous pits.

Pygidium with a vertical central and two lateral impressions.

Posterior tibia apex fringed with very short, equal, dense spinules; tarsus about as long as tibia; basal metatarsite considerably longer than metatarsites 2-5 combined.

Ventral side as in Figs 10, 11. Ventral surfaces mostly with punctures bearing minute, pale, appressed setae. Punctures on profemur surface medium-sized to coarse, fairly regularly distributed. Punctures on mesofemur surface medium-sized in central area, smaller and less distinct at base and apex. Metafemur surface with fine punctures throughout. Metasternal plate in anterior half with area containing about ten enormously large, reniform, non-setigerous punctures each side of midline. Abdominal ventrites with small depressed areas at lateral margin containing few coarse punctures. Terminal ventrite with medium-sized punctures.

Aedeagus as in Figs 28, 29.

Epipharynx as in Fig. 23.

Sexual dimorphism. Middle and posterior tibiae of the female without the large triangular tooth projecting inward from the tibia apex, which is present in the male; only a small spine projects backward in female.

Differential diagnosis. The *R. vitikabourecki* sp. nov. differs from the two sympatric species, *R. kudrnai* sp. nov. and *R. snizeki* sp. nov. by its larger size, shallower punctures in flat elytral intervals and enormously large, reniform, non-setigerous punctures on the metasternal plate.

Distribution. Ecuador.

Name derivation. Patronymic. Named after the collector of the type material, Vít Kabourek (Zlín, Czech Republic).

KEY TO SPECIES FROM THE WESTERN HEMISPHERE HAVING THREE ROWS OF PUNCTURES IN THE SECOND FLAT ELYTRAL INTERVAL

- 1(12) the third flat elytral interval with 3 rows of coarse punctures.
- 2(11) small species (4-5.3 mm). Coarse punctures in flat elytral intervals very deep, their surroundings shining. Metasternal plate with normal setigerous punctures only.
- 3(6) apical ends of elytral costae 1-4 are adjacent to terminal, inward-bent part of costa 5 and thus, preapical depressed area covered with yellowish-white glandular material is relatively small (Figs. 5-6).
- 4 (5) anterior half of the first (central) pronotal furrow impunctate or at most indistinctly punctate. All punctures in the 1st flat elytral interval distinctly delimited. The 3rd elytral costa about as long as the 2nd one. 5.3 mm. Costa Rica *R. isidroi* Cartwright et Woodruff, 1969
- 5(4) anterior half of the first (central) pronotal furrow with very distinct, medium-sized punctures. In the 1st flat elytral interval, many punctures of inside row are transversally confluent with those of outside row. The 3rd elytral costa apically distinctly longer and more elevated than the 2nd one. 4.6 mm. Cuba, Jamaica) *R. zayasi* Cartwright et Woodruff, 1969
- 6(3) apical ends of elytral costae 1-4 are well separated from terminal, inward-bent part of costa 5 and thus, preapical depressed area covered with yellowish-white glandular material is relatively large (Figs 1, 2, 4).
- 7(8) in the 1st flat elytral interval, outside row of punctures almost complete, inside row terminating posteriorly at about apical elevation of the 2nd costa. Metasternal plate with a deep and wide, posteriorly constricted median longitudinal furrow, with an impressed short, longitudinal row of coarse punctures each side of the furrow. 3.8 mm. Costa Rica *R. costaricensis* Cartwright et Woodruff, 1969
- 8(7) in the 1st flat elytral interval, both rows of punctures vanishing posteriorly (before apical end of the 2nd costa). The median longitudinal furrow of metasternal plate shallower, open posteriorly; the metasternal plate without any row of coarse punctures each side of the furrow.
- 9(10) lateral areas of ventrites 4 and 5 with large, distinct triangular impressions (Fig. 30). Furrow along profemur anterior margin normal. Punctures on mesofemur surface about as large as those on profemur surface, mostly separated by twice puncture diameter. Metafemur with small to medium-sized, fairly regularly distributed punctures. Setae on ventrites exceeding ventrite lengths. Terminal ventrite with few (3-4) large, pit-like punctures at middle, otherwise with fine to medium-sized punctures. Aedeagus with blunt parameres (see lateral view in Fig. 25). 4.8 mm. Ecuador *R. kudrnai* sp. nov.
- 10(9) lateral areas of ventrites 4 and 5 punctate, at most with traces of indistinct impressions indicated by few coalescent punctures (Fig. 31). Furrow along profemur anterior margin very deep. Punctures on mesofemur surface smaller and shallower than those on profemur surface, sparser along anterior margin and at mesofemur apex. Metafemur with medium-sized punctures in apical half, with smaller and sparser punctures in basal half. Setae on ventrites shorter than the ventrites. Terminal ventrite with coarse punctures anteriorly, which gradually become smaller and sparser posteriorly. Aedeagus with parameres having narrow, acute apices (see lateral view in Fig. 27). 3.6-4.8 mm. Ecuador *R. snizeki* sp. nov.
- 11(2) a species longer than 5.5 mm. Coarse punctures in flat elytral intervals shallower, their surroundings matte. Metasternal plate in anterior half with area containing about ten enormously large, reniform, non-setigerous punctures each side of midline. 5.7-5.8 mm. Ecuador *R. vitikabourecki* sp. nov.
- 12(1) the third flat elytral interval with 4 rows of coarse punctures. 4.6-5.0 mm. Dominica, Guadeloupe *R. spilmani* Cartwright et Chalumeau, 1978

DISCUSSION

The three new species of the genus *Rhyparus* described here belong to a group of species having three rows of punctures in the second flat elytral interval. In the revision of *Rhyparus* species from the Western Hemisphere by Cartwright & Woodruff (1969), there are three species sharing this character as follows: *R. costaricensis* Cartwright et Woodruff, *R. isidroï* Cartwright et Woodruff and *R. zayasi* Cartwright et Woodruff. Holotypes of all the three species were studied here. On the other hand, it was unnecessary to study any type material of a further species described later by Cartwright & Chalumeau (1969) (*R. spilmani* Cartwright et Chalumeau), which is rather outstanding within this group because of having four rows of punctures in the third flat elytral interval.

All the three new species may be differentiated from each other as well as from other species of the group discussed here based on the Key to Species presented above. The *R. vitikaboureki* sp. nov. is characteristic by its largest size, relatively small preapical elytral area covered with yellowish white glandular material, matte dorsal surface with coarse but relatively shallow punctures in elytral intervals and peculiar sculpture of the metasternal plate.

The *R. snizeki* sp. nov. and *R. kudrnai* sp. nov. belong to species having the preapical depressed area covered with yellowish-white glandular material relatively large and the characters on ventral surfaces are of importance for their differentiation within the group discussed.

Data summarized in the Introduction show that only one species of the genus *Rhyparus* has still been known from South America. Given the fact that three new species from Ecuador were described above in the section Results, it is possible to expect that further representatives of the genus occur in the continent.

Table 1. Summarization of characters on ventral surfaces observed in holotypes of three species of the genus *Rhyparus*.

<i>R. costaricensis</i> Cartwright et Woodruff, 1969	<i>R. isidroï</i> Cartwright et Woodruff, 1969	<i>R. zayasi</i> Cartwright et Woodruff, 1969
Profemur surface essentially everywhere with medium-sized punctures, separated by less than puncture diameter	Profemur surface essentially everywhere with coarse, not particularly deep punctures separated by less than puncture diameter	Profemur surface with coarse, deep punctures separated by less than puncture diameter in basal half, but with much smaller, shallower and sparser punctures in apical half
Punctures on mesofemur surface medium-sized, denser posteriorly, sparser anteriorly and at base	Punctures on mesofemur surface smaller and shallower compared to those on profemur, nearly absent along posterior margin	Punctuation on mesofemur similar to that on profemur, but fairly dense throughout

Metafemur with medium-sized punctures in about apical third, nearly impunctate in about basal two thirds	Metafemur with few coarse punctures in apical third, with medium-sized punctures along posterior margin and nearly impunctate in anterior two thirds	Metafemur with medium-sized punctures throughout
Ventrites with small depressed areas at lateral margins containing few coarse punctures	Ventrites with small depressed areas at lateral margins containing few coarse punctures	Ventrites with small depressed areas at lateral margins containing few coarse punctures
Terminal ventrite with few coarse punctures or even pits	Terminal ventrite with medium-sized punctures, rather less distinct under relatively dense and long setae	Terminal ventrite with dense, coarse punctures
Setae in ventrite setigerous punctures shorter than ventrites	Setae in ventrite setigerous punctures long, dense, their length comparable to ventrite length	Setae in ventrite setigerous punctures longer than ventrites, but relatively sparse

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